JOURNAL FOR SOCIAL SCIENCE STUDIES
*An International Peer-Reviewed Open Access Journal*

ISSN (Online): 3006-2071 | ISSN (Print): 3006-2063
Volume 4 • Issue 4 • August 2026

# COMPARATIVE PHYSICAL FITNESS AND BODY COMPOSITION PROFILES OF SHOOTING AND FORMAL VOLLEYBALL PLAYERS: A CROSS-SECTIONAL STUDY

**Muhammad Sufyan[1], Muhammad Zia ul Haq[*2], Shazia Haq[3], Sajid Mehmood[4]**

[1]*Department of Physical Education and Sports Sciences, Faculty of Education, The Islamia University of Bahawalpur, Punjab, Pakistan*
[*2]*Associate Professor, Department of Physical Education and Sports Sciences, The Islamia University of Bahawalpur, Pakistan*
[3]*PhD Student, Department of Sports Sciences and Physical Education, Gomal University, Dera Ismail Khan, Pakistan.*
[4]*Assistant Director Sports, Bahawalnagar Campus, The Islamia University of Bahawalpur, Pakistan*

[*2]muhammad.zia@iub.edu.pk

[*2]https://orcid.org/0000-0002-6372-7958

**DOI:** https://doi.org/10.5281/zenodo.22638818

**Keywords**
*body composition, community sport, field testing, formal volleyball, rural Pakistan, shooting volleyball*

**Article History**
Received: 28 June 2026
Accepted: 15 August 2026
Published: 31 August 2026

*Copyright @Author*
**Corresponding Author: ***
**Muhammad Zia ul Haq**

## Abstract

*The aim of this cross-sectional study was to compare selected physical-fitness and body-composition characteristics of the shooting-volleyball and the formal-volleyball players. The tournament was played under flexible rules, which was a shooting volleyball, while the tournament played under the rules of the Fédération International de Volleyball (FIVB) was considered as formal volleyball. The number of the players in the shooting-volleyball group was 57 players and the number of players in the formal-volleyball group was 57 players (n = 114). The handgrip strength, upper-body and abdominal muscular endurance, flexibility, change-of-direction performance, sprint time, upper-body explosive power and endurance were measured with a standardized field battery, while anthropometry and bioelectrical impedance were used for the estimation of body composition. The mean scores of these groups were compared using independent-samples t tests. All formal-volleyball players performed better on most fitness measures, and had an estimated leaner body-composition profile, with a similar height and body mass and BMI. These results prove that there are different measured profiles but do not suggest that either of the playing formats was responsible for the differences. The main advantage of the study is the analysis made of a culturally important rural game of volleyball compared to the rules-based volleyball as regulated by the FIVB and the identification of needs for a future ruleset-specific study.*

JOURNAL FOR SOCIAL SCIENCE STUDIES
An International Peer-Reviewed Open Access Journal
ISSN (Online): 3006-2071 | ISSN (Print): 3006-2063
Volume 4 • Issue 4 • August 2026

## 1. Introduction

Volleyball is a team sport with intermittent activities, where technical execution is continuously overlaid on short bursts of speed, quick changes of direction, powerful upper-body movements and standing volleyball, which involves many jumps. These actions require an integrated physical profile and not an individual attribute in terms of their ability to sustain these actions throughout training and competition (Dimenna & Jones, 2016). Strength assists in supporting, attacking, blocking, court propulsion and ball control; muscular endurance: to sustain skills during rallies and sets; agility and speed: to get to an effective position in a short time; aerobic fitness: to recover between multiple high intensity actions. Unlike the traditional monitoring described above, the modern monitoring is not only based on field-performance testing or on assessment of body composition but also combines both aspects giving a more complete picture of the status of the athlete (Cereda, 2025; Matłosz et al., 2023; Rebelo et al., 2024). Furthermore, for specific movement-related parameters (such as the types of movement), balance, power, and volleyball performance, depending on the age group, competitive level, and program as well as intervention research, neuromuscular and stabilization programs can also improve specific volleyball performance parameters (Erkan & Telci, 2025; Trajković & Bogataj, 2020).

Both aim for the same outcome, that of getting a ball over a net, but are from two different cultures of sport and rules. International volleyball is standardized – there are rules in the current FIVB rulebook for an indoor volleyball game (6 players), a court (18 × 9 m), a ball, the net height, a volleyball position, volleyball rules, substitutions and the referees (FIVB, 2025). In South Asia, particularly in rural Pakistan, volleyball can be played by a large number of players, played on large courts, played with a high volleyball net, played with a different ball, played in a different manner, and played with different rules relating to the number of contacts, which vary from locality to locality and/or by tournament. It is played between seven and eight players, includes a net specialist, striking with both the two hands, and has been modified in many ways since its inception according to location and there are local variations in the rules (Traditional Sports & Games Pakistan Association, 2024). These are merely descriptions to provide some indication of culture only and do not accurately reflect the rules of the current study.

The rule code for the tournament/community shooting group should be documented and be easily reproducible when compared to the code regulated by the FIVB (D'Elia et al., 2020). These are the energetic and neuromuscular demands which change depending on court size, net height, ball mass and circumference, team size, player role, number of contacts allowed, the nature of a rally, footwear, playing surface, length of match, training frequency and level of competition. These are all important pieces of information to help packagers have confidence in the differences they see between the two groups due to playing format.

The significance of body composition is to be taken with a pinch of salt. BMI cannot differentiate between fat mass and fat-free mass, and an analysis of competitive volleyball players revealed that body fat measurements varied by sex and method of estimation (Matłosz et al., 2023). The practical field estimates provided by BIA are influenced by hydration, what has recently been consumed, recent exercise, skin temperature, posture, device equations and body geometry. The most important concepts in the current metrological guidance are calibration, traceability, preparation of standards, proper positioning of electrodes, and the explicit consideration of the uncertainty due to the model (Brantlov et al., 2026).

Finally, as well as a performance sport, the relevance of shooting volleyball cannot be denied as an integrated community sport in the community. Shooting volleyball is a peculiar recreational activity that was earlier identified in a published survey in Pakistan, but there are little scientific studies available that describe the rules, requirements of the match, injuries profile and fitness characteristics of the game

JOURNAL FOR SOCIAL SCIENCE STUDIES
An International Peer-Reviewed Open Access Journal
ISSN (Online): 3006-2071 | ISSN (Print): 3006-2063
Volume 4 • Issue 4 • August 2026

(Khan et al., 2022). This lack of exposure means that this is a truly new comparison, but it's not enough to compensate for the poor exposure definition. Scientifically, it is more complicated to compare the shooting-volleyball and formal-volleyball groups than to compare two volleyball groups playing the same game. Contributing factors that can impact the results include age, training age, weekly training volume, playing position, level of competition, nutrition, injury history, socioeconomic access, coaching quality, timing of the season, and specific rules (Eom & Schutz, 1992). A cross-sectional difference will not be able to tell us if it is related to the sport format or if it is related to player selection, to exposure to different training levels, or to access of different facilities, or to some combination of these. Numbers, therefore, should be included in comparisons, with no causal or hierarchical language.

Although volleyball is played all around the rural areas of Pakistan, there is less evidence in the context of shooting volleyball. The comparisons with FIVB regulated volleyball at the district level can give the coach an idea whether the conditions are different between the two and help him/her encourage the formalization of district practices (Harabagiu, 2021). The present study is therefore not meant to be a comparative ranking of the two formats, but rather, an exploratory and hypothesis generating comparison.

The main goal was to compare some physical fitness and body composition parameters of the selected subjects between the shooting players and formal volleyball players in district Bahawalpur. Secondary objectives included (a) the demographic profile and distributional characteristics of the measures, (b) estimation of standardized group differences and (c) practical recommendations for assessment and conditioning. It was hypothesized that there would be a difference in profile of fitness and body composition between the two groups.

## 2. Methodology

### 2.1 Research Design

It was a design of quantitative, comparative and of cross section. The exposure group status was volleyball format (shooting or formal) and the outcomes were fitness test scores, and body composition estimates during one assessment period. The design allows for inferences of differences between naturally occurring groups at the same time (Creswell & Creswell, 2023). The design of the study was a cross-sectional design, and a STROBE reporting guide was observed (von Elm et al., 2007).

### 2.2 Sample, Population, and Setting

Target population was male of District Bahawalpur of shooting and formal Volleyball players age 18-35 actively training and/or playing in the district Bahawalpur of Punjab, Pakistan. The selection was done using purposive sampling since the inclusion was based on the willingness to participate in one of the two formats and the ability to complete the assessments. The analytical sample consisted of 114 athletes, 57 of which were shooting and 57 were formal volleyball players. The number of individuals reported by showing data of age, or training exposure in the source as guided by (Sieroń, Stachoń, & Pietraszewska, 2023).

JOURNAL FOR SOCIAL SCIENCE STUDIES
An International Peer-Reviewed Open Access Journal
ISSN (Online): 3006-2071 | ISSN (Print): 3006-2063
Volume 4 • Issue 4 • August 2026

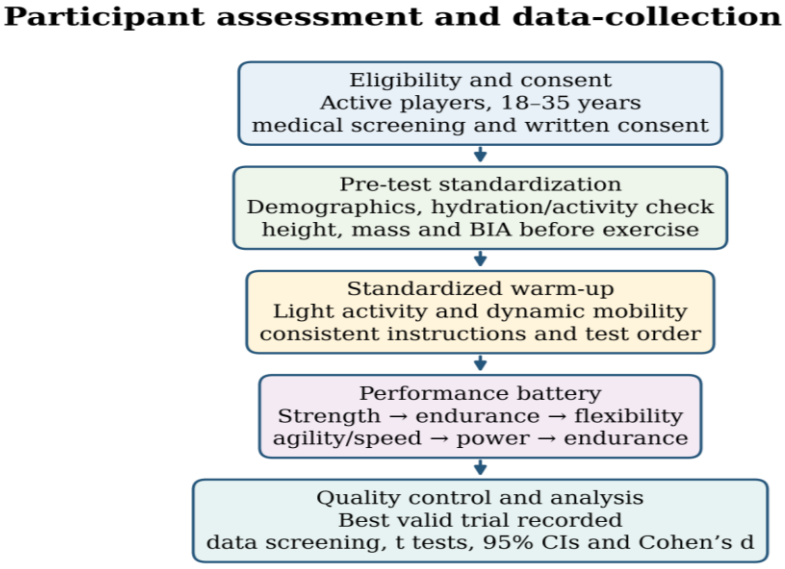


***Figure 1. Participant assessment and data collection workflow. Recruitment sites, dates, device specifications, rest intervals, and local shooting-volleyball rules require confirmation from original records***

**2.3 Variables and Measurement Tools**

The volleyball format was used as the grouping variable. The fitness measures included the dominant-hand grip strength, number of push-ups, number of 1-minute sit-ups, distance on sit and reach, Illinois Agility time, 20 meters sprint time, distance of the seated medicine ball throw, distance of the Yo-Yo Intermittent Recovery Test Level 1 (YR1), and a reported 6 min endurance distance. Two trials of handgrip strength were taken with the strongest hand and the highest score entered (Saeed, Iqbal, & Haq, 2023). Push-up counts were made until the participant was no longer able to maintain the proper technique and sit-up counts were made over 1 minute. Flexibility (Pescatello et al., 2009) was the farthest possible standardized box. These were the Illinois course and a 20-m sprint that were timed; smaller numbers indicate better performance. Explosive power in the upper body was assessed using a two-handed medicine ball throw from the seated position with minimal power from the lower body generated (Šimonek et al., 2016). The teaching, demonstration, warm-up, rest, and verbal cueing procedure was to be standardized to reduce the variation in procedure. Handgrip testing has a moderate, complete correlation with the shoulder-rotation strength and is thus recommended to be used in conjunction with other complementary tests for shoulder and upper-body strength in volleyball shooting (Ahmadi et al., 2020).

JOURNAL FOR SOCIAL SCIENCE STUDIES
*An International Peer-Reviewed Open Access Journal*

ISSN (Online): 3006-2071 | ISSN (Print): 3006-2063
Volume 4 • Issue 4 • August 2026



**Conceptual model for comparing shooting and formal volleyball**

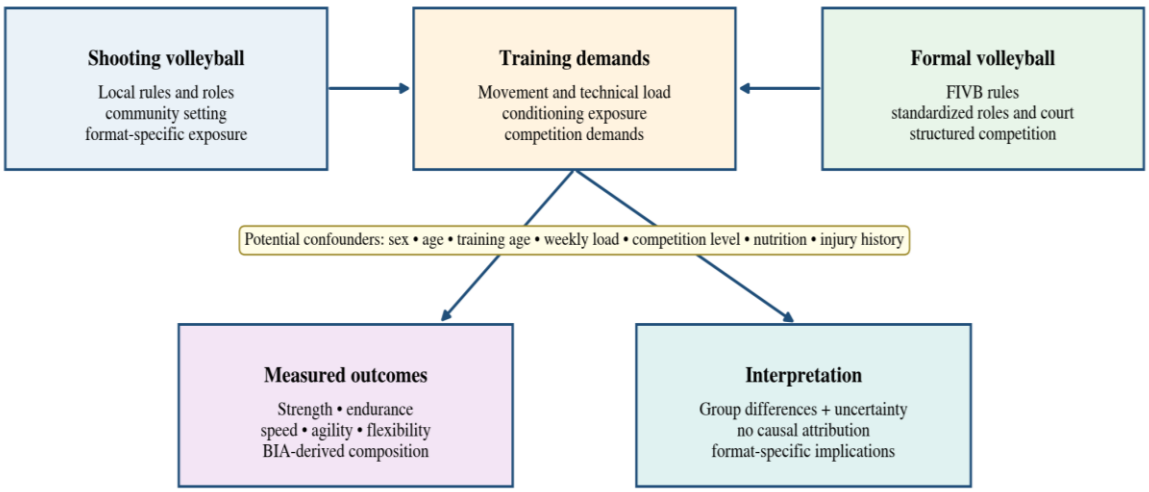


**Figure 2. Diagram shows volleyball format, training demands, measured outcomes, confounding variables and cautious interpretation.**

Length was measured barefoot to the nearest 0.1 cm with the head in the Frankfurt plane, and body mass measured in light clothes to the nearest 0.1 kg, and BMI was determined as body mass/$m^2$. BIA estimates body-fat percentage, skeletal muscle mass, fat-free mass and BMR. However, for repeated assessment, it is necessary to use the same analyzer, the same prediction equations, the same position and protocol of the preparation of the examined

JOURNAL FOR SOCIAL SCIENCE STUDIES
An International Peer-Reviewed Open Access Journal
ISSN (Online): 3006-2071 | ISSN (Print): 3006-2063
Volume 4 • Issue 4 • August 2026

participants, since the results of assessments of body composition obtained from different methods are not interchangeable (Brantlov et al., 2026; Matłosz et al., 2023). The source file includes a partial pretest standardization schedule, similar conditions and the same analyzer.

***Table 1; Measurement battery and procedural safeguards***

| Domain | Tool/test | Scoring and quality control |
|---|---|---|
| Strength | Handgrip dynamometer | Two attempts; dominant hand; best score (kg) |
| Muscular endurance | Push-up and 1-min sit-up tests | Valid repetitions under standardized technique |
| Flexibility | Sit-and-reach box | Farthest valid reach (cm) |
| Agility/speed | Illinois course; 20-m sprint | Timed performance; lower score is better |
| Upper-body power | Seated medicine-ball throw | Best of two throws (m) |
| Endurance | Yo-Yo IR1; six-minute push | Distance (m); mode-specific interpretation required |
| Anthropometry | Stadiometer; digital scale | Height, body mass, and calculated BMI |
| Body composition | BIA analyzer | Body fat, skeletal muscle, fat-free mass, estimated BMR |

Note. The equipment models and full BIA standardization conditions were not available in the source file and require author verification.

**2.4 Validity and Reliability**

Content and procedural validity were addressed by reviewing the test by experts and administering the test on a standardized basis in the source study. It should be remembered, however, that the other important requirement for validity is the definition of exposure, as well as the relevance of the test. Shooting format should be established according to the local rules, which will be followed by all participating clubs and formal volleyball should be linked directly with the FIVB rulebook. There should be general tests for sprint, agility, strength as well as flexibility and body composition in both ambulatory groups but it is crucial to use the same test protocols and environmental conditions to allow for defensible comparison (Sieroń, Stachoń, & Pietraszewska, 2023).

The overall internal consistency (Cronbach's alpha) of this thesis was .921, and for the pilot-study was .793 to .903. Only pilot reported values are stored in these values. It is not a good one score reliability measure for different types of single score performance measures (such as height, sprint time, grip strength, BMR etc.) and should only be used to assess internal consistency reliability for more than one indicator measuring a common latent construct. A more comprehensive reliability plan would include the ICC model, type and definition along with the 95% confidence intervals, the coefficient of variance, the standard error of measurement and the minimal detectable change (Koo & Li, 2016; Weir, 2005). Relative reliability (ICC) and absolute error indices (CV and MDC) have been traditionally employed in reliability studies of sporting skills, but a high ICC does not necessarily translate to an index being reliable enough for athlete monitoring purposes (Bucher et al., 2023). There was no raw repeated trial data provided with the indices, and they were not recalculated and were not fabricated. The procedural safeguards for reliability described in this current article are best valid score, repeated attempts (as reported),

JOURNAL FOR SOCIAL SCIENCE STUDIES
An International Peer-Reviewed Open Access Journal
ISSN (Online): 3006-2071 | ISSN (Print): 3006-2063
Volume 4 • Issue 4 • August 2026

trained assistance, test ordering, and calibration.

### 2.5 Data-Collection Procedure

Permission was obtained from relevant clubs, schools, community coordinators and district sports officials. Athletes were informed that the study would focus on the effects of energy drinks on students, how the study would be conducted, any potential discomforts, that all data would be confidential, and that they could withdraw at any point in the study; it is reported that written informed consent was obtained (Waqas et al., 2021). These details have been adhered to since the original approval and field documentation as per the 2024 Declaration of Helsinki (World Medical Association 2024). Equipment was checked and testing area was prepared before each testing session. Participants were first asked to complete a demographic sheet, which included age, gender, type of volleyball played, volleyball experience, and playing position. Before any fatiguing exercise, measurements of height, body mass and BIA were taken as recommended to reduce the impedance variations caused by acute exercise and hydration (Brantlov et al., 2026). Athletes completed a standardized warm-up which included light activity, dynamic mobility and stretching prior to performing the performance battery. The events reported were handgrips, pushups, sit ups, sit and reach, agility, sprint, medicine ball throw, and endurance. Carry-over fatigue was minimized by providing rest periods between tests and trained assistants were used to administer and record scores.

### 2.6 Statistical Analysis

The categorical variables were described by frequencies and percentages, and the continuous variables were described by means and standard deviations. The distribution shape was determined by using the skewness and kurtosis coefficients given. Absolute skewness scores were less than 0.50, and absolute kurtosis scores were less than 0.55 for all scores, thus suggesting approximate symmetry and justifying the use of parametric comparisons. The Shapiro-Wilk test is mentioned in the thesis methodology (DeVellis & Thorpe, 2021).

Independent-samples t-test was used to compare the means of shooting and formal volleyball. The reported group means, standard deviations and sizes were used to recalculate these tests with a pooled variance estimator based on 113 degrees of freedom. Two-sided p values, mean differences, approximate 95% confidence intervals and Cohen's d were reported. Instead of only interpreting thresholds (Cohen, 1988; Lakens, 2013), emphasis was placed on effect sizes and confidence intervals.

## 3. Results

### 3.1 Participant Characteristics

This study involved 115 athletes, 71.3% of which were male. The age group 22-25 years was the highest with 35.7% of the sample. Most athletes were experienced players with at least 2 years of experience. These percentages are meant to give an overview of the sample shows equivalency between the shooting and formal volleyball groups. The detailed information on age, training exposure, position, and competition level of each group is essential for confounding factors evaluation and must be provided before submission.

*Table 2: Demographic characteristics of the participants (N = 114)*

| Variable | Category | N | % |
|---|---|---|---|
| Age | 18–21 years | 28 | 24.3 |
| | 22–25 years | 41 | 35.7 |

JOURNAL FOR SOCIAL SCIENCE STUDIES
An International Peer-Reviewed Open Access Journal
ISSN (Online): 3006-2071 | ISSN (Print): 3006-2063
Volume 4 • Issue 4 • August 2026

| Variable | Category | N | % |
|---|---|---|---|
| | 26–30 years | 31 | 27.0 |
| | 31–35 years | 15 | 13.0 |
| Experience | <2 years | 19 | 16.5 |
| | 2–4 years | 38 | 33.0 |
| | 5–7 years | 35 | 30.4 |
| | >7 years | 23 | 20.0 |
| Position | Setter | 24 | 20.9 |
| | Spiker/outside hitter | 37 | 32.2 |
| | Middle blocker | 26 | 22.6 |
| | Libero/defensive specialist | 18 | 15.7 |
| | Universal/opposite | 10 | 8.7 |

Note. Percentages may not total exactly 100 because of rounding.

**3.2 Normality Assessment**

Distributions were shown as being symmetric in the vicinity of the peaks. The values for skewness ranged from -0.44 (sit-up repetitions) to +0.43 (body-fat percentage), while the values for kurtosis ranged from -0.54 (Yo-Yo distance) to -0.21 (push-up repetitions). These were well within the range of standard screening levels—and therefore not a significant deviation from normality.

***Table 3; Descriptive statistics and distributional shape***

| Outcome | M | SD | Skewness | Kurtosis |
|---|---|---|---|---|
| Handgrip strength | 40.28 | 5.17 | -0.41 | -0.32 |
| Push-ups | 33.66 | 4.63 | -0.38 | -0.21 |
| Sit-ups | 37.00 | 4.71 | -0.44 | -0.28 |
| Sit-and-reach | 26.60 | 3.58 | -0.29 | -0.47 |
| Illinois agility | 17.14 | 0.83 | 0.31 | -0.42 |
| 20-m sprint | 3.30 | 0.24 | 0.27 | -0.36 |
| Medicine-ball throw | 6.18 | 0.67 | -0.35 | -0.30 |
| Yo-Yo IR1 distance | 1436.58 | 189.74 | -0.26 | -0.54 |
| Six-minute push distance | 901.82 | 76.83 | -0.18 | -0.39 |
| Height | 172.54 | 5.96 | -0.15 | -0.48 |
| Body mass | 69.17 | 7.08 | 0.19 | -0.36 |
| BMI | 23.23 | 2.14 | 0.24 | -0.31 |

JOURNAL FOR SOCIAL SCIENCE STUDIES
An International Peer-Reviewed Open Access Journal
ISSN (Online): 3006-2071 | ISSN (Print): 3006-2063
Volume 4 • Issue 4 • August 2026

| Outcome | M | SD | Skewness | Kurtosis |
|---|---|---|---|---|
| Body fat | 16.56 | 2.78 | 0.43 | -0.27 |
| Skeletal muscle mass | 32.81 | 2.87 | -0.39 | -0.41 |
| Fat-free mass | 58.22 | 4.74 | -0.22 | -0.33 |
| Estimated BMR | 1673.49 | 118.42 | -0.34 | -0.46 |

Note. M = mean; SD = standard deviation. All coefficients support approximate symmetry; however, Shapiro-Wilk statistics were unavailable.

### 3.3 Physical-Fitness Comparisons

Formal-volleyball players demonstrated a mean handgrip score that was 4.12 kg higher, $t(113) = -4.50$, $p < .001$, $d = 0.84$. A 95 percent confidence interval for the difference between shooting and formal players was also determined for pushups, sit-ups, flexibility, sprint time, medicine-ball throw, and endurance distances, with significant standardized differences found in all of these. The time to complete the Illinois agility test was longer for the shooting group (0.64 s) as compared to the control group, $t(113) = 4.56$, $p < .001$, suggesting that the shooting group performed slower. The greatest standardized difference was found in the Yo-Yo IR1 distance ($d = 1.26$), followed by the medicine-ball throw ($d = 1.13$) and the 20-m sprint ($d = 1.11$).

This trend indicates individual patterns in measurements, drawing such a conclusion as "better overall fitness" would be too easy. The results are based on general fitness in the field and not on a specific need for playing of shooting-volleyball matches. The differences may be due to the selection, training dosage, facilities, or level of competition as well as the playing format, without information about the group demographics. The result of the debate was not interpreted as substantive.

*Table 4: Comparison of reported physical-fitness outcomes*

| Outcome | Shooting volleyball | Formal volleyball | t(113) | p | D |
|---|---|---|---|---|---|
| Handgrip strength (kg) | 38.24 ± 5.18 | 42.36 ± 4.61 | -4.50 | < .001 | 0.84 |
| Push-ups (repetitions) | 31.48 ± 4.27 | 35.87 ± 3.89 | -5.76 | < .001 | 1.07 |
| Sit-ups (repetitions) | 34.76 ± 4.52 | 39.28 ± 4.03 | -5.66 | < .001 | 1.06 |
| Sit-and-reach (cm) | 24.83 ± 3.41 | 28.41 ± 3.12 | -5.87 | < .001 | 1.09 |
| Illinois agility (s) | 17.46 ± 0.81 | 16.82 ± 0.69 | 4.56 | < .001 | 0.85 |
| 20-m sprint (s) | 3.42 ± 0.24 | 3.18 ± 0.19 | 5.94 | < .001 | 1.11 |
| Medicine-ball throw (m) | 5.84 ± 0.62 | 6.52 ± 0.58 | -6.07 | < .001 | 1.13 |
| Yo-Yo IR1 distance (m) | 1328.45 ± 176.52 | 1546.84 ± 168.93 | -6.78 | < .001 | 1.26 |
| Six-minute distance (m) | 865.74 ± 72.41 | 938.62 ± 68.54 | -5.54 | < .001 | 1.03 |

Note. Values are M ± SD. Comparisons were recalculated from reported summaries.

### 3.4 Body-Composition Comparisons

Height, body mass, and BMI did not exhibit significant differences between the groups:

JOURNAL FOR SOCIAL SCIENCE STUDIES
An International Peer-Reviewed Open Access Journal
ISSN (Online): 3006-2071 | ISSN (Print): 3006-2063
Volume 4 • Issue 4 • August 2026

height, t(113) = -1.68, p = .096; body mass, t(113) = -1.57, p = .120; and BMI, t(113) = -0.45, p = .654. The confidence interval for each of these mean differences included 0. Thus the data do not support the statement that there was any difference in overall body size between the groups.

However, there were distinctive patterns in composition-specific estimates. Shooting-volleyball players exhibited 1.74 percentage points more body fat, t(113) = 3.50, p < .001, |d| = 0.65. Formal-volleyball players demonstrated an estimated 2.49 kg greater skeletal muscle mass, t(113) = -5.15, p < .001, d = 0.96; 2.79 kg more estimated fat-free mass, t(113) = -3.25, p = .002, d = 0.61; and an estimated BMR approximately 70 kcal/day higher, t(113) = -3.33, p = .001, d = 0.62.

***Table 5; Comparison of body-composition outcomes***

| Outcome | Shooting volleyball (n = 58) | Formal volleyball (n = 57) | t(113) | p | \|d\| |
|---|---|---|---|---|---|
| Height (cm) | 171.62 ± 6.14 | 173.48 ± 5.72 | -1.68 | = .096 | 0.31 |
| Body mass (kg) | 68.15 ± 7.26 | 70.21 ± 6.83 | -1.57 | = .120 | 0.29 |
| BMI (kg/m²) | 23.14 ± 2.21 | 23.32 ± 2.08 | -0.45 | = .654 | 0.08 |
| Body fat (%) | 17.42 ± 2.84 | 15.68 ± 2.47 | 3.50 | < .001 | 0.65 |
| Skeletal muscle mass (kg) | 31.58 ± 2.76 | 34.07 ± 2.41 | -5.15 | < .001 | 0.96 |
| Fat-free mass (kg) | 56.84 ± 4.81 | 59.63 ± 4.37 | -3.25 | = .002 | 0.61 |
| Estimated BMR (kcal/day) | 1638.75 ± 116.42 | 1708.94 ± 109.38 | -3.33 | = .001 | 0.62 |

Note. Values are M ± SD. BMR = basal metabolic rate; BMI = body mass index. BIA-derived values are estimates and depend on the device equations and testing conditions.

JOURNAL FOR SOCIAL SCIENCE STUDIES
An International Peer-Reviewed Open Access Journal
ISSN (Online): 3006-2071 | ISSN (Print): 3006-2063
Volume 4 • Issue 4 • August 2026

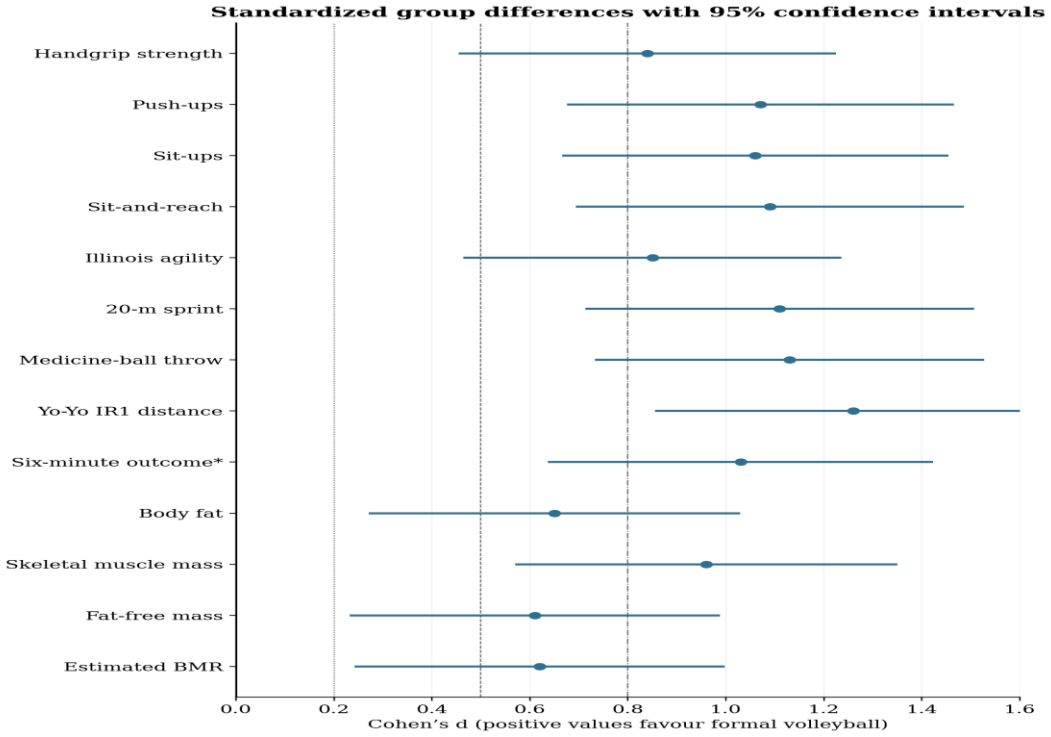


***Figure 2. Standardized group differences with approximate 95% confidence intervals derived from reported summaries.***

## 4. Discussion

This is an exploratory cross-sectional study comparing the shooting-volleyball players in a rural Pakistani sports environment with the formal volleyball players who play under FIVB rules. In general, the formal volleyball players demonstrated greater positive scores on most fitness and BIA derived indices, with similar results for height, body mass and BMI. The effects were generally within the moderate to large range, but the interpretation would depend on the validity of the group labels, the validity of test standardization and the control of confounding factors.

This difference in muscular fitness may be due to variation in training structure not merely the rules. Formal volleyball involves playing positions, strength and conditioning, standardized volleyball court and balls, and a lot of jumping and multidirectional movement American College of Sports Medicine, 2024). On the other hand, volleyball can include a powerful upper limb shot, fast play, and localised player positioning. So, the present results are in favor of the training-context hypothesis and not towards a causal statement.

The primary novelty is the awareness of shooting volleyball as a new type of rural sport. During the audit, evidence was found that the activity is recognized in Pakistan, albeit there are technical descriptions that are inconsistent, and there is limited peer-reviewed performance research (Khan et al., 2022; Traditional Sports & Games Pakistan Association, 2024). This is why precise operationalization becomes very important in this respect.

Agility and sprint were task specific. The formal group results of faster Illinois-agility and 20-m sprint times could be systematic locomotor training, court size, surface, shoe type, player selection, or sex and training age differences (Bocanegra et al., 2015). Both groups are ambulatory volleyball players and therefore the same tests used, however, equivalence of the measurements must also have similar instructions, timing, familiarization and environmental conditions.

The results of the endurance tests are mostly in terms of internal consistency. For both groups,

JOURNAL FOR SOCIAL SCIENCE STUDIES
An International Peer-Reviewed Open Access Journal
ISSN (Online): 3006-2071 | ISSN (Print): 3006-2063
Volume 4 • Issue 4 • August 2026

the manuscript has a distance reported for Yo-Yo IR1 as well as a six-minute push distance. This term push does not correspond to the corrected shooting-versus-formal population and may represent an old term from another study or a misnomer for a test Bangsbo, Iaia, & Krustrup, 2008). It is recommended that until the raw score sheets and original protocol are available, and the test name, movement mode, course, units and group allocation are confirmed, the six-minute outcome should not be used for substantive interpretation or claims of aerobic superiority (Teplan et al., 2012).

The similarity of the height, body mass and BMI suggest that the observed pattern of composition was not just because of differences in overall body size. Estimated body fat and estimated skeletal muscle mass, fat-free mass, and BMR were found to be lower and higher, respectively, in formal volleyball players than in non-players, respectively. This pattern may be related to structured conditioning or selection, but the four BIA outputs are interrelated mathematically and physiologically.

BIA estimates rely on models rather than being criterion measurements. Values can be affected by various factors, including hydration level, food, recent exercise, environmental temperature, other device equations, posture, electrode placement and time of day (Brantlov et al., 2026; Matłosz et al., 2023). The differences in groups are only believable if both groups were tested with the same calibrated equipment with the same preparation procedure.

Results are consistent with the principle of training specificity, which holds that repeated exposure to different rules, roles, court environments, and conditioning practices might result in different fitness profiles. In modern times, volleyball monitoring uses internal load, jump or movement load, neuromuscular fatigue, and well-being (Rebelo et al., 2024). Going forward, the chosen ICC should be clearly identified with 95% confidence intervals and coefficients of variation, and a standard error of measurement and minimal detectable change should be included (Koo & Li, 2016; Weir, 2005). Standardized monitoring may be used by shooting-volleyball coaches to identify the conditionings to focus on while retaining the local character of the sport. These results provide comparison to those obtained at formal-volleyball programs to measure speed, agility, strength and composition under FIVB-relevant conditions.

## 5. Conclusion

Formal volleyball players showed more favorable overall results for most field fitness measures and leaner profile (BIA) than the other group, and both groups were similar about height, body mass, and BMI. These are raw Pearson statistic correlation values and cannot be taken as evidence of/formal volleyball being better or that the rules of formal volleyball caused these differences. The logical one to draw from the results is that there was a different measured profile for athletes of the two playing contexts. It is crucial to determine the exact rules for shooting volleyball, group comparability, training exposure, equipment, and the controversial six minute result. The manuscript provides novelty to publish as volleyball is a sport whose cultural significance is not widely covered in sports science literature.

## 6. Recommendations

Write and incorporate a standard checklist of volleyball rules for the shooting of the game, including team composition, court dimensions, the characteristics of the net, the ball, player contacts, playing roles, the scoring system, substitutions, playing surfaces, and officiating rules. Information was gathered on demographics specific to each group, their training exposure, competition level, playing positions, injury history, nutrition, and access to facilities. Make sure to keep general fitness tests and environmental conditions the same between groups and analyse the match-demand tests in different formats separately.

ISSN (Online): 3006-2071 | ISSN (Print): 3006-2063
Volume 4 • Issue 4 • August 2026

**References**

Ahmadi, M., Nobari, H., Ramirez-Campillo, R., Pérez-Gómez, J., Ribeiro, A. L. D. A., & Martínez-Rodríguez, A. (2021). Effects of plyometric jump training in sand or rigid surface on jump-related biomechanical variables and physical fitness in female volleyball players. International journal of environmental research and public health, 18(24), 13093.

American College of Sports Medicine. (2024). ACSM's guidelines for exercise testing and prescription (12th ed.). Wolters Kluwer.

Bangsbo, J., Iaia, F. M., & Krustrup, P. (2008). The Yo-Yo intermittent recovery test: A useful tool for evaluation of physical performance in intermittent sports. Sports Medicine, 38(1), 37–51. https://doi.org/10.2165/00007256-200838010-00004

Brantlov, S., Jødal, L., Hvas, C. L., Isidor, S., Rud, C. L., Nielsen, J., Redsted, M., & Ward, L. C. (2026). Metrology in bioelectrical impedance analysis (BIA): From measurement science to clinical and research applications. Sensors, 26(13), 4017. https://doi.org/10.3390/s26134017

Bucher, E., Millet, G. P., Wehrlin, J. P., & Steiner, T. (2023). Test–retest reliability of ski-specific aerobic, sprint, and neuromuscular performance tests in highly trained cross-country skiers. Scandinavian Journal of Medicine & Science in Sports, 33(12), 2482–2498. https://doi.org/10.1111/sms.14473

Cereda, F. (2025). Physical fitness profile of elite female volleyball players: An observational study correlating bioimpedance vector analysis (BIVA) with field-based testing. Journal of Science in Sport and Exercise. Advance online publication. https://doi.org/10.1007/s42978-025-00340-0

Cohen, J. (1988). Statistical power analysis for the behavioral sciences (2nd ed.). Routledge.

Creswell, J. W., & Creswell, J. D. (2023). Research design: Qualitative, quantitative, and mixed methods approaches (6th ed.). SAGE.

D'Elia, F., D'Isanto, T., Altavilla, G., & Raiola, G. (2021). Evolution of explosive strength data in youth volleyball players before and after pandemic. Physical Education Theory and Methodology, 21(4), 375-380.

DeVellis, R. F., & Thorpe, C. T. (2021). Scale development: Theory and applications (5th ed.). SAGE.

DiMenna, F. J., & Jones, A. M. (2016). Cardiorespiratory control of exercise and adaptation to training. Strength and conditioning for sports performance. Routledge, New York, 92-117.

Eom, H. J., & Schutz, R. W. (1992). Statistical analyses of volleyball team performance. Research Quarterly for Exercise and Sport, 63(1), 11–18. https://doi.org/10.1080/02701367.1992.10607551

Erkan, R., & Telci, E. A. (2025). Impact of stabilization exercises on athletic performance and injury risk in college volleyball players. International Journal of Sports Physiology and Performance, 20(7), 948–957. https://doi.org/10.1123/ijspp.2024-0348

Fédération Internationale de Volleyball. (2025). Official volleyball rules 2025–2028. https://www.fivb.com/wp-content/uploads/2025/01/FIVB-Volleyball_Rules2025_2028-EN-v05.pdf

Harabagiu, N. (2021). The methodology of applying the "data volley" programme of statistical analysis within volleyball sports competitions. The Science of Physical Culture, 36/2.

ISSN (Online): 3006-2071 | ISSN (Print): 3006-2063
Volume 4 • Issue 4 • August 2026

https://doi.org/10.52449/1857-4114.2020.36-2.09

Khan, W., Arif, T., & Hussain, F. (2022). Understanding the perceived barriers and facilitations of student sports participation: A case study of Gomal University Dera Ismail Khan. The Sky, 6, 93–108.

Koo, T. K., & Li, M. Y. (2016). A guideline of selecting and reporting intraclass correlation coefficients for reliability research. Journal of Chiropractic Medicine, 15(2), 155–163. https://doi.org/10.1016/j.jcm.2016.02.012

Lakens, D. (2013). Calculating and reporting effect sizes to facilitate cumulative science: A practical primer for t-tests and ANOVAs. Frontiers in Psychology, 4, 863. https://doi.org/10.3389/fpsyg.2013.00863

Matłosz, P., Makivic, B., Csapo, R., Hume, P., Mitter, B., Martínez-Rodríguez, A., & Bauer, P. (2023). Body fat of competitive volleyball players: A systematic review with meta-analysis. Journal of the International Society of Sports Nutrition, 20(1), 2246414. https://doi.org/10.1080/15502783.2023.2246414

Rebelo, A., Pereira, J. R., Cunha, P., Coelho-e-Silva, M. J., & Valente-dos-Santos, J. (2024). Training stress, neuromuscular fatigue and well-being in volleyball: A systematic review. BMC Sports Science, Medicine and Rehabilitation, 16, 17. https://doi.org/10.1186/s13102-024-00807-7

Saeed, N., Iqbal, T., & Haq, M. Z. U. (2023). Influence of Resistance Training on Fitness and Volleyball Service Performance of the Female Players: of the Islamia University Bahawalpur, Pakistan. International" Journal of Academic Research for Humanities, 3(4), 306-314.

Sieroń, A., Stachoń, A., & Pietraszewska, J. (2023). Changes in body composition and motor fitness of young female volleyball players in an annual training cycle. International Journal of Environmental Research and Public Health, 20(3), 2473. https://doi.org/10.3390/ijerph20032473

Šimonek, J. (2019). Agility in sport. Cambridge Scholars Publishing.

Traditional Sports & Games Pakistan Association. (2024). Shooting volleyball. https://tsgpakistan.com/shooting-volleyball/

Trajković, N., & Bogataj, Š. (2020). Effects of neuromuscular training on motor competence and physical performance in young female volleyball players. International Journal of Environmental Research and Public Health, 17(5), 1755. https://doi.org/10.3390/ijerph17051755

von Elm, E., Altman, D. G., Egger, M., Pocock, S. J., Gøtzsche, P. C., & Vandenbroucke, J. P. (2007). The Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) statement: Guidelines for reporting observational studies. PLOS Medicine, 4(10), e296. https://doi.org/10.1371/journal.pmed.0040296

Waqas, M. A., Iqbal, F., Zia ul Haq, M., Nadeem, Z., Haq, S., & Ahmad, S. (2021). Endurance Capacity of The Pakistani National Football Players According to Their Playing Position. International Journal of Physiotherapy, 235-238.

Weir, J. P. (2005). Quantifying test–retest reliability using the intraclass correlation coefficient and the SEM. Journal of Strength and Conditioning Research, 19(1), 231–240. https://doi.org/10.1519/15184.1

ISSN (Online): 3006-2071 | ISSN (Print): 3006-2063
Volume 4 • Issue 4 • August 2026

World Medical Association. (2024). WMA Declaration of Helsinki: Ethical principles for medical research involving human participants. https://www.wma.net/policies-post/wma-declaration-of-helsinki/